

EXHIBIT 3

REDACTED

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION**

United States of America, *et al.*,

Plaintiffs,

v.

Google LLC,

Defendant.

Case No. 1:23-cv-00108-LMB-JFA

Hon. Leonie H. M. Brinkema

EXPERT REBUTTAL REPORT OF ROBIN S. LEE, PHD

February 13, 2024

IV. Market definition

- (56) As noted in my initial report,¹⁰² market definition is a useful tool for analyzing antitrust and monopolization claims, and for evaluating the competitive effects of exclusionary conduct. Market definition productively focuses attention where potential competitive effects from particular conduct are likely to occur. A relevant product market identifies a set of products, including at least one product for the firm whose conduct is being scrutinized, over which an alleged or potential monopolist could possess and exercise market power.
- (57) One of the challenges with product market definition is determining the set of products to include in a relevant antitrust market. The “hypothetical monopolist test” (HMT) is a well-known economic framework that economists have used to make this determination. The HMT determines whether products should be contained within a relevant product market on the basis of whether they would constrain a “hypothetical monopolist” from profitably exercising market power. Dr. Israel appears to agree with this characterization, noting that “[t]he HMT provides a framework” for evaluating the proximity of substitutes based on whether:¹⁰³
- a hypothetical profit-maximizing firm, not subject to price regulation, that was the only present and future seller of the products in the candidate market (the “hypothetical monopolist”) likely would impose at least a small but significant and non-transitory increase in price (SSNIP) on at least one product in the market, with the price increase evaluated relative to the competitive price that would obtain in the alleged market.
- (58) One of the benefits of the HMT is that it provides disciplined criteria for determining whether alternative products should be included in relevant markets. That is, a relevant market should contain close substitutes, determined on the basis of whether those products would constrain the exercise of market power by a hypothetical monopolist.¹⁰⁴

¹⁰² Lee Initial Report, ¶¶ 241–242.

¹⁰³ Israel Report, ¶ 157, citing to United States Department of Justice and Federal Trade Commission, *Merger Guidelines*, December 18, 2023 (hereinafter “2023 Merger Guidelines”), §4.3.A. Note that the merger guidelines also reference a worsening of non-price terms (SSNIP) (“When evaluating a merger of sellers, the HMT asks whether a hypothetical profit-maximizing firm, not prevented by regulation from worsening terms, that was the only present and future seller of a group of products (“hypothetical monopolist”) likely would undertake at least a small but significant and non-transitory increase in price (“SSNIP”) or other worsening of terms (“SSNIP”) for at least one product in the group.”).

¹⁰⁴ Contrary to Dr. Israel’s assertions, implementing the HMT does not require independent “quantitative estimates of substitution” (Israel Report, ¶ 158). Thus, Dr. Israel is incorrect when he claims that I do not perform an HMT for the relevant product markets (Israel Report, ¶¶ 293–294, 320). Dr. Israel fails to account for the quantitative exercises that I have performed that inform the extent to which customer substitution would constrain the exercise of market power. In Lee Initial Report, § IV, Figures 34–38 empirically illustrate differences between Google Ads and DV360 transactions and the extent of advertiser multihoming between the two products (Figures 34–38). In Lee Initial Report, § V, I present direct evidence of market power, which indicates that products outside the market do not constrain Google products let

- (59) In the rest of this Section, I address points raised by Google’s experts as they relate to the relevant markets defined in my initial report.
- In Section IV.A, I discuss conceptual and economic flaws with Dr. Israel’s approach to market definition, and identify errors made repeatedly throughout his report.
 - In Section IV.B, I explain why Dr. Israel and Prof. Ghose fail to show that the ad tech tools used to transact open-web display advertising are not important from the perspective of both advertiser and publishers. In particular, I note that both experts fail to appreciate differences between substitution in response to an increase in the price of open-web display advertising and in response to an increase in the price of *ad tech tools* used to facilitate their sale. Both experts also narrowly focus their analysis on advertiser substitution across different advertising formats, broadly neglecting to address the limited substitutes available to open-web publishers for monetizing web display inventory.
 - In Sections IV.C–E, I explain why Google’s experts do not undermine my opinions that publisher ad servers, ad exchanges, and advertiser ad networks are valid relevant markets and appropriate for analyzing Google’s conduct and market power in this matter.
 - In Section IV.F, I describe why Dr. Israel’s single “market for ad tech tools as a whole”¹⁰⁵ is inappropriate for analyzing the economic issues that arise in this matter by obscuring the primary competitive constraints for Google’s ad tech products, and masking the extent to which Google possesses market power over the relevant products and is able to materially harm competition through its actions.
 - In Section IV.G, I discuss why Dr. Israel incorrectly dismisses the economic relevance of a worldwide geographic market and ignores key reasons why it is appropriate to analyze Google’s market power and conduct beyond the boundaries of the United States.

IV.A. Dr. Israel’s approach to market definition is flawed

- (60) Dr. Israel’s criticisms of the relevant product markets defined in my initial report rely on recurring arguments and interpretations of evidence that are flawed from a conceptual and economic basis. In this section I discuss high level issues with Dr. Israel’s approach, and why his arguments do not affect

alone a hypothetical monopolist. In particular, for AdX, I analyze Google’s quantitative simulations and elasticity estimates; and I conduct fee comparisons that account for the relative sizes of ad exchanges. *See* Lee Initial Report, § V.C.3. For Google Ads, I analyze Google experiments and simulations and I measure the extent of Google Ads margin dispersion and the effect of the removal of Google Ads would have on publisher payouts. *See* Lee Initial Report, § V.D.3. In Sections IV and V of this report, I also discuss the direct evidence of Google’s substantial and sustained market power with its DFP, AdX, and Google Ads products that Dr. Israel fails to address. Such direct evidence indicates that the HMT would be satisfied for each of the relevant product markets.

¹⁰⁵ Israel Report, § IV.G.1, ¶ 344.

Israel is incorrect. First, for the purposes of market definition, it is sufficient to show that a hypothetical monopolist that owned all products would likely possess enough market power to profitably implement a SSNIP; establishing that only one participant possesses monopoly power, which is a higher bar and generally associated with substantial and sustained market power protected by significant barriers to entry, is not a necessary criterion for defining a relevant product market.¹⁴² Second, the direct evidence I provide does indicate that Google possesses substantial market and sustained market power in the relevant markets at issue (see Section V below), and is thus more than sufficient to satisfy the HMT.

IV.B. Open-web display advertising is a distinct and important form of advertising for publishers and advertisers, indicating that customer substitution would not constrain the exercise of market power in the relevant markets

- (93) In my initial report, I defined relevant product markets for *publisher ad servers*, *ad exchanges*, and *advertiser ad networks*.¹⁴³ Each of these product markets contain *ad tech tools* that are used to transact open-web display advertising. In these transactions, Google or other ad tech intermediaries are sellers, and there are two sets of distinct customers: advertisers (on the demand-side) and open-web publishers (on the supply-side).¹⁴⁴
- (94) I also discussed why—even though these relevant product markets do not contain the underlying display advertisements themselves, and are thus distinct from a hypothetical product market containing *open-web display advertising*—it is still nonetheless useful to examine how open-web display advertising is an important and distinct form of advertising from the perspective of advertisers and publishers.¹⁴⁵ Such analysis is informative because it clarifies why products that facilitate open-web display advertising transactions are particularly valued by open-web publishers and advertisers, and why products that do not facilitate such transactions are not close substitutes.¹⁴⁶
- (95) This distinction between the underlying display advertisements and the ad tech tools that facilitate their sale is important. One reason is that a firm that monopolizes parts of the ad tech stack can create a bottleneck and exercise market power even if there is a meaningful amount of digital advertising

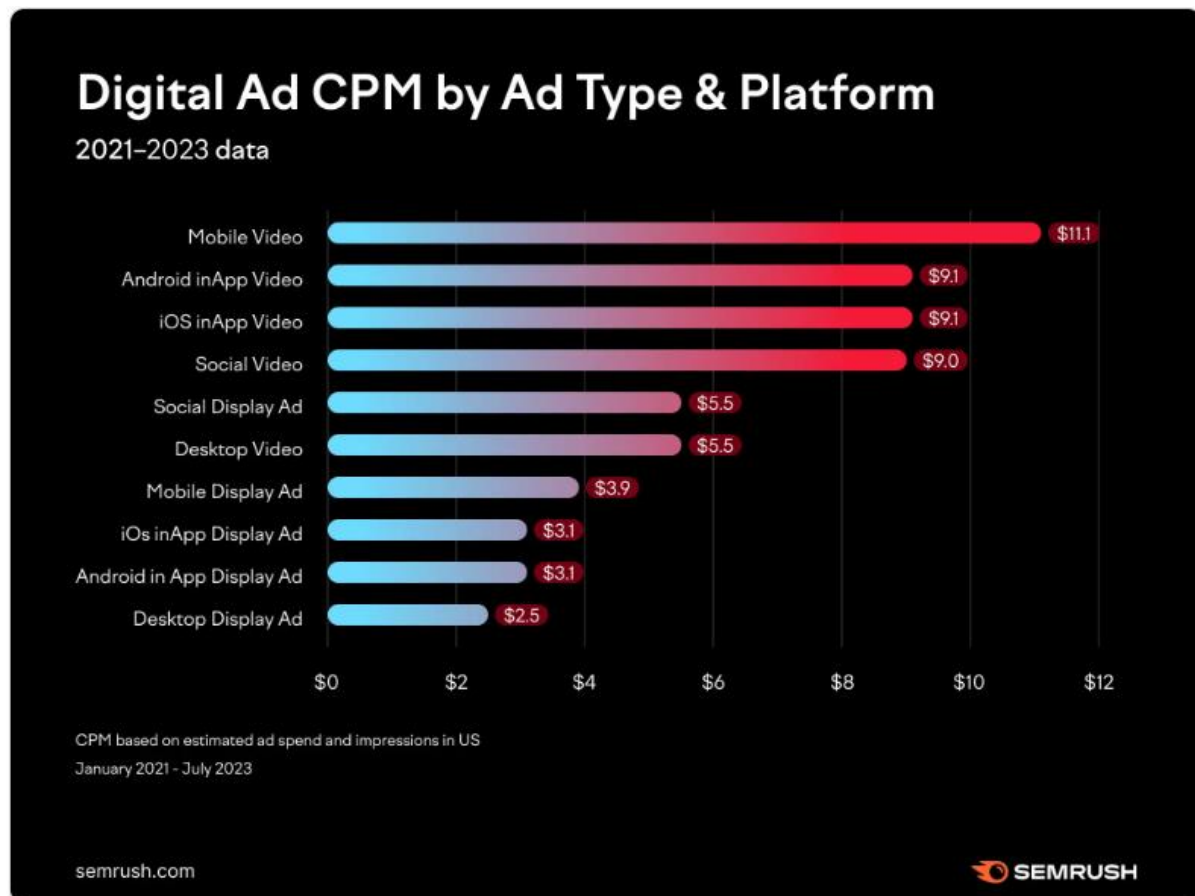
¹⁴² Dr. Israel's own definition of the HMT used to define relevant markets makes no mention of monopoly power, but rather only that a hypothetical monopolist "that was the only present and future seller of the products in the candidate market... likely would impose at least a [SSNIP] on at least one product in the market, with the price increase evaluated relative to the competitive price that would obtain in the alleged market." (Israel Report, ¶ 157).

¹⁴³ Lee Initial Report, § IV.

¹⁴⁴ Lee Initial Report, ¶ 52.

¹⁴⁵ Lee Initial Report, § IV.B.

¹⁴⁶ Lee Initial Report, ¶ 245.

Figure 4. Semrush analysis of “Digital Ad CPM by Ad Type & Platform”

Source: Luke Harsel, “Advertising Trends: CPM Benchmarks by Industry [Study],” *Semrush*, October 23, 2023, <https://www.semrush.com/blog/advertising-cpm-benchmarks-study/>

- (103) Google’s experts also erroneously claim that certain advertising types or forms of digital advertising are “excluded” from the product market.¹⁵⁵ However, this again misses the distinction between tools that transact advertising, and the underlying advertising itself. The relevant product markets contain those tools (publisher ad servers, ad exchanges, and advertiser ad networks) that transact open-web display advertising; such tools can also transact other forms of advertising, including direct deals, in-app display, and instream video ads. A product is only excluded if it cannot transact open-web display ads.¹⁵⁶
- (104) What Google’s experts appear to argue (albeit not very clearly), but fail to support, is that the relevant product markets need to be broadened to include products that might sell other forms of digital

¹⁵⁵ See discussion in Section IV.B.2.c.

¹⁵⁶ In my market share calculations, I restrict attention to open-web display transactions even if some of these products may transact other types of digital advertising.

- (110) Dr. Israel’s discussion of publishers substituting away from open-web display advertising is limited to speculation that “if one or more publisher ad servers focused on display advertising for open web publishers degrades...publishers have options that include focusing more attention on other formats for content, including app-based options.”¹⁶⁷ I address Dr. Israel’s hypothesized example of publisher ad server substitution in Section IV.C.1.
- (111) So while it is true that publishers may find it valuable to deploy multiple forms of digital advertising or transaction types within their “monetization toolbox,”¹⁶⁸ web display advertising has distinct features and value that make it an important form of advertising—i.e., it is an important tool in the toolbox. Hence, open-web publishers would be unlikely to substitute away to a sufficient degree from products that transact display advertising to constrain the exercise of market power by a hypothetical monopolist of publisher ad servers, ad exchanges, or advertiser ad networks.

IV.B.2. Advertiser perspectives on open-web display advertising

- (112) Dr. Israel asserts that my focus on open-web display advertising “excludes important alternative sources of advertising inventory to which advertisers could turn if the cost of open web display advertising increase” including “integrated advertising tools, in-app, instream video, and native advertising.”¹⁶⁹ Prof. Ghose argues that advertisers “reallocate their advertising budgets more efficiently and in real time across different types of advertising formats, devices, and properties” and that this “undermines [my] opinion that open-web display advertising is differentiated.”¹⁷⁰
- (113) I do not dispute that many advertisers use multiple forms of digital advertising, or that advertisers can substitute across channels on the margin. Nevertheless, as with a hammer and screwdriver, advertisers can use multiple forms of advertising to achieve different objectives even if those forms may be potential substitutes for certain tasks.
- (114) However, with regard to the arguments made here, Google’s experts fail to apply the economic principles articulated by the HMT to determine whether a relevant product market is too narrow.
- (115) First, Dr. Israel and Prof. Ghose do not recognize that advertiser substitution alone, without consideration of publishers’ ability to substitute, would be insufficient to conclude that alternative

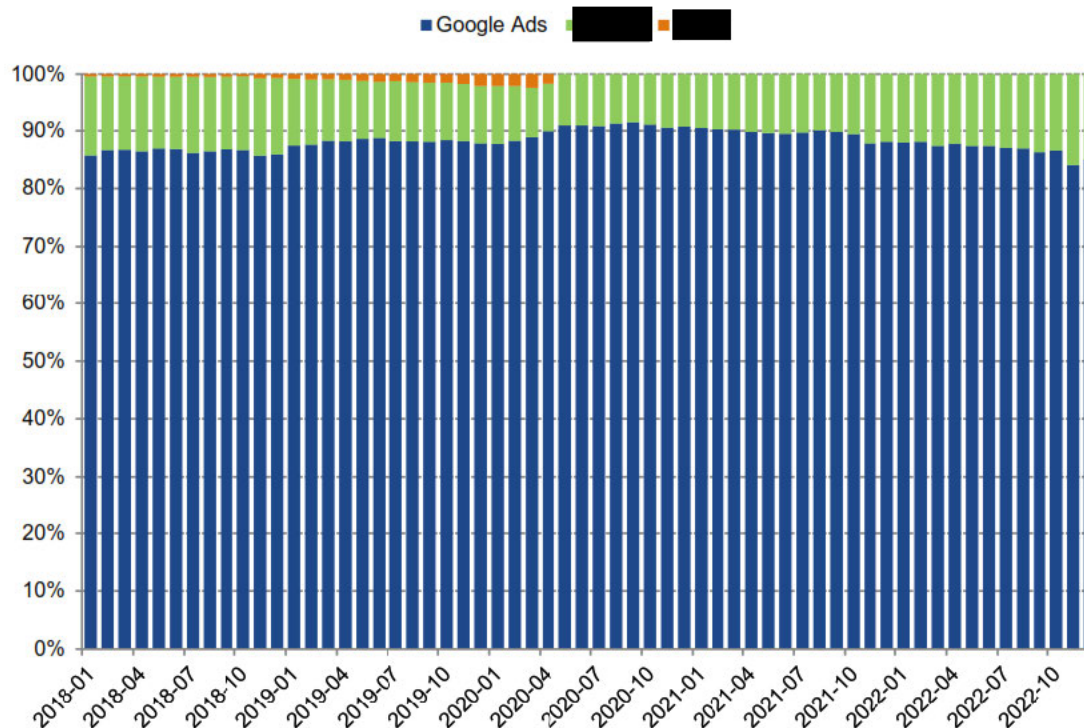
¹⁶⁷ Israel Report, ¶ 298. Dr. Israel also suggests that *within* open-web display advertising, publishers could shift from indirect to direct transactions. Israel Report, ¶ 278. In Section IV.B.4 of my initial report and Section IV.B.3 of this report I explain why indirect transactions provide additional distinct value to publishers compared to direct transactions.

¹⁶⁸ Lee Initial Report, § IV.A.2.

¹⁶⁹ Israel Report, ¶ 217–218.

¹⁷⁰ Ghose Report, ¶ 91. As a matter of economics, customer substitution—even if potentially immediate or in real time—does not “undermine” the existence of product differentiation. I also understand that Prof. Wilbur concludes that Prof. Ghose’s claims about the interchangeability of different digital advertising formats and properties are incorrect. *See* Expert Rebuttal Report of Kenneth Wilbur, Ph.D., February 13, 2024 (hereinafter “Wilbur Report”), § III.

Figure 8. Figure 56 from Lee Initial Report (“Google Ads has maintained a substantial share of worldwide indirect open-web display impressions among advertiser ad networks (2018–2022)”)



Source: Google Ads data (DOJ RFP 54); Bidding tools panel (See Appendix H.1.b).

Notes: Denominator includes open-web display impressions from Google Ads, [REDACTED] and [REDACTED]. Impressions include all indirect open-web display transactions from these parties. [REDACTED] exited the open-web display market in April 2020.

- (140) Google’s experts err by asserting that if transactions are restricted to open-web display advertisements for the purposes of computing market shares (even among products that can facilitate non-open-web display transactions), then non-open-web display “transactions” are “excluded” from the relevant product markets. Again, such an error arises from Google’s experts confusing the underlying display ads for the ad tech tools used to sell those advertisements (see Section IV.B). As I note there and in my initial report,²¹⁸ for the purposes of computing market shares (which are used as indirect evidence of market power, *not as the basis for defining relevant markets*), I restrict attention to open-web display transactions so as to illuminate, not obscure, the extent to which Google possesses market power over different sets of ad tech products. However, this does not mean that ad tech products that *could also* be used to sell other forms of advertising are necessarily excluded as products from the relevant markets.

²¹⁸ Lee Initial Report, n. 576 (“Where possible, I exclude transactions that are sold through a publisher’s own integrated ad tech products from market share estimates. Limiting market share calculations to transactions fulfilled on ad inventory not owned and operated by an ad tech product more accurately reflects the competitive significance of a product’s ability to transact open-web display inventory.”).

network, ad exchange, or publisher ad server (even those owned by companies like Amazon or Facebook) that allowed for the purchase of open-web display advertising would be contained in one of the relevant product markets.²⁴¹

- *“Advertising through integrated platforms often requires the advertiser to use the website’s own ad tech tools, and to manage their budgets across different integrated and non-integrated ad tech products independently.”*²⁴²

Prof. Ghose identifies limited examples of owned-and-operated platforms that make inventory available through DSPs,²⁴³ but does not claim that this the case for certain large integrated platforms (including Amazon, Google and Meta’s O&O properties).²⁴⁴ Moreover, to the extent that inventory is available through third-party ad tech tools like ad exchanges, such transactions would be included in the relevant market share calculations and my analyses of the relevant markets.

- (147) Dr. Israel does not address the four reasons that I identified above, but nevertheless asserts that advertisers could switch from open-web display advertising ad tech tools to integrated advertising tools in response to a price increase.²⁴⁵ He also asserts that an advertiser could then reach the same user through a different site—e.g., Facebook or Instagram—that they would otherwise reach on an open-web publisher’s website.²⁴⁶ To support his assertions, Dr. Israel points to Google documents, “cross-visitation data,” and “advertiser multi-homing.” I discuss next why these do not establish that advertisers view advertising on properties using integrated ad tech tools as sufficiently close

63 (“Meta Audience Network allows advertisers to leverage data on Meta users ... to target their desired audience effectively across not only Meta’s own properties, but also the websites and apps of third parties.”). As I explain in the Lee Initial Report, “Meta Audience Network (formerly Facebook Audience Network) facilitated advertising transactions to open-web publishers until 2020, when it shifted focus to advertising on Meta O&O properties and select third-party mobile apps.” Lee Initial Report, ¶ 101. *See also*, Allison Schiff, “Facebook is Killing Off Its Web Supply In Audience Network – And Don’t Be Surprised If It All Shuts Down,” *adexchanger*, February 5, 2020, <https://www.adexchanger.com/platforms/facebook-is-killing-off-its-web-supply-in-audience-network-and-dont-be-surprised-if-it-all-shuts-down/>; Meta, “Changes to Web and In-stream Placements,” accessed February 11, 2024, <https://www.facebook.com/business/help/645132129564436>; Meta, “Meta Audience Network,” accessed February 11, 2024, <https://www.facebook.com/audiencenetwork/>.

²⁴¹ In Section III.B of Prof. Ghose’s report, he argues that some self-supply ad tech products also facilitate the sale of open-web display impressions. As I discussed in Section V of my initial report, to the extent that there are tools that facilitate the sale of both open-web and self-supply display inventory, those tools are in my markets, but the relevant set of transactions to assess their competitive significance in the relevant markets is their open-web display transaction volume. Examples of these tools include FAN, Xandr, Yahoo, and Google. Note that X Audience Platform, which Prof. Ghose provides as an example of an integrated ad product that facilitates third-party ad sales, does not allow for the purchase of web ad inventory. “X Audience Platform”, X Business, accessed February 11, 2024, <https://business.twitter.com/en/help/campaign-setup/twitter-audience-platform.html>

²⁴² Lee Initial Report, ¶ 303.

²⁴³ Ghose Report, ¶ 40. There is limited detail available to verify Prof. Ghose’s claims because several of the sources are either very new (e.g., Disney’s deal in October 2023) or very old (e.g., a Twitter reference to 2014).

²⁴⁴ Google considers these large integrated platforms unaddressable. *See* Lee Initial Report, Figure 42. *See also*, Lee Initial Report, ¶ 279, Lee Initial Report, n. 162, Lee Initial Report, n. 594, Lee Initial Report, n. 31.

²⁴⁵ Israel Report, ¶ 221.

²⁴⁶ Israel Report, ¶¶ 219–221.

substitutes to constrain a hypothetical monopolist of a single ad tech component (publisher ad servers, ad exchanges, or advertiser ad networks) from exercising market power over advertisers and open-web publishers.

- (148) **Documents.** Dr. Israel first highlights a number of Google documents he claims support his assertion because they reference Facebook and Amazon as potential competitors.²⁴⁷ But as Dr. Israel recognizes, market definition analyzes “demand-side substitution” and “products that are reasonably interchangeable from the point of view of customers.”²⁴⁸ That Google documents discuss other firms as competitors does not speak to their substitutability from the perspective of customers. Though it may be common for firms to look at different levels of competition or look at their business in both broad and narrow groupings of competing products, that does not make those groupings antitrust markets.²⁴⁹
- (149) Dr. Israel also mischaracterizes Google’s documents. For example, he quotes selectively from a Google document that states “[a]rguably, Facebook is one of the biggest competitive threats to Google” but ignores that the document summarizes the “competitive threat [Facebook] presents to various areas of Google’s business” and that it elsewhere notes that “Google is an *undisputed leader of ad tech* and offers pubs a compelling end to end solution for all their needs, while *Facebook has pulled back from ad tech after more limited success*. Where Facebook offers the biggest competitive threat is ad formats, specifically native, where it currently wins in implementation and performance.”²⁵⁰ And notably, Dr. Israel’s documents about Facebook predate FAN’s exit from open-web display in April 2020.²⁵¹
- (150) Similarly, Dr. Israel quotes from a 2018 Google document that “Amazon is an existential threat” but ignores that the document is assessing Amazon holistically across a variety of product offerings; and that for ad tech tools specifically it describes “Ad Server” as “Threat Low”; “Ad Network” as “Threat Medium Focus on remarketing & product ads” and “Ad Exchange” as “Threat N/A.”²⁵²

²⁴⁷ Israel Report, ¶¶ 176, 222.

²⁴⁸ Israel Report, ¶ 153.

²⁴⁹ Jonathan B. Baker, “Market Definition: An Analytical Overview,” *Antitrust Law Journal* 74, no. 1 (2007), 130 (labeling markets as relevant or antitrust markets “distinguish[es] these markets from what business executives and consultants might define for other purposes.”).

²⁵⁰ GOOG-DOJ-11788944, at -946–947, -979 (08/01/2019) (emphasis added). *See also*, -981 (“We cannot underestimate the value of a full stack when it comes to owning the tag and successfully competing with FAN. Partners can consolidate native within their overall workflow seamlessly, everything from demand management through mediation to measurement and analytics through GA/Firebase. This is the area where Facebook cannot come close to competing, especially as they have taken a step back from adtech in 2016 to date.”); -952 (“Facebook is a mobile first company...”); -956 (“...with Video and Mobile projected to drive long-term growth” (citing distinct growth categories of: Oculus VR, Graph Search, Instagram, Video Ads, Mobile App Install, Newsfeed – Desktop, Newsfeed – Mobile, Global RHS Display, Audience Network)).

²⁵¹ Israel Report, ¶ 222. Dr. Israel presents twelve documents that predate 2020 and one document from February 2020.

²⁵² GOOG-DOJ-12634156, at -160, -206 (01/16/2018). The two products that are labeled “Threat High” are “Paid Search”

Thus, Dr. Israel’s inferences regarding Google’s market power as derived from his market share calculations are flawed.³⁶⁴

- (221) Dr. Israel presents two alternative market share calculations in his Figure 52 and 53, that show Google with a 30–45 percent share of “publisher ad servers.” These calculations are not informative for assessing the market power Google possesses with DFP.
- (222) In Figure 52, Dr. Israel computes shares of among publisher ad servers including sales from firms that do not make their publisher ad servers commercially available, such as Meta, Pinterest, Snapchat, and TikTok. This proposed modification includes products that cannot serve as a substitute for an open-web publisher: an open-web publisher cannot monetize its content with the tools provided by Meta, Pinterest, Snapchat, or TikTok. These firms do not produce publisher ad servers for open-web publishers, and Dr. Israel has not provided evidence that they would do so. Dr. Israel fails to acknowledge that Facebook ultimately abandoned its plans to create a competitor to Google’s open-web display products.³⁶⁵ Thus, as these alternatives are not substitutes for those open-web customers of publisher ad servers and—even with significant resources, in the case of Facebook—face substantial barriers to entry and expansion (given the dominance of DFP), their inclusion is not warranted when computing shares meant to inform Google’s market power in publisher ad servers.
- (223) Yet, Dr. Israel argues that “although to my knowledge these companies do not currently offer their in-house ad servers to third-party publishers, their choice to develop their own ad server indicates that ad server self-supply is a viable option for at least some publishers, especially large publishers.”³⁶⁶ Even if self-supply were a valid option, Dr. Israel has not established that it is a meaningful constraint on the exercise of market power by a hypothetical monopolist of publisher ad servers (as discussed above), and hence that it invalidates the publisher ad server market. As I discussed in my initial report and above, there are substantial costs and barriers to successfully doing so. There is no basis for arguing that the option of “self-supply” should somehow represent 55–62% of the open-web display publisher ad server market, as Dr. Israel seems to do.
- (224) In his Figure 53, Dr. Israel presents an alternative calculation of shares of publisher ad servers that includes all forms of digital advertising and not just display advertising. As I discussed in my opening report and reviewed in Section IV.B. above, publishers cannot easily shift users to alternative methods of accessing their content (e.g., in-app or instream video advertising) to the extent they lack such content. Furthermore, as I discussed above in Section IV.C.1.a, for those publishers with multiple methods of accessing content (e.g., web and app), any substitution across these formats is highly unlikely to be sufficient to constrain a monopolist of publisher ad servers from exercising

³⁶⁴ See also, the further discussion regarding market shares in Section V.A.2 below.

³⁶⁵ Lee Initial Report, § IV.B.2.b, ¶¶ 447–448. See also, Sections V.A.4 and V.B.1.

³⁶⁶ Israel Report, Figure 53.

market power. Thus there is no basis for including all forms of digital advertising along with display advertising in a publisher ad server market.

- (225) Dr. Israel has thus shown that modifying publisher ad server market shares to include products that are *not* an option for open-web publishers reduces DFP's market share. This is unsurprising. For reasons discussed above, Dr. Israel's alternative share calculations are not appropriate for evaluating Google's conduct in the ad tech stack, and do not affect my conclusion that Google wields substantial and sustained market power with its DFP product.³⁶⁷

IV.D. Ad exchanges for open-web display advertising is a relevant product market

- (226) In my initial report, I discussed why ad exchanges that can be used to transact open-web display advertising (henceforth, "ad exchanges") is an appropriate relevant antitrust market for analyzing the conduct at issue in this matter.³⁶⁸ As I discussed in that report, ad exchanges offer specific functionalities and benefits that are not replicated in full by alternative methods or products.³⁶⁹ In particular they allow publishers using publisher ad servers access to real-time bids from multiple demand sources and bidding tools.³⁷⁰
- (227) Dr. Israel in response argues that ad exchanges "does not constitute a well-defined antitrust product market."³⁷¹ Dr. Israel's main argument is that an open-web display ad exchange market "ignores commercial realities of vigorous competition for *advertiser spending*," (emphasis added) which include, in his estimation: (i) other ways of connecting advertisers and publishers such as ad networks or direct deals between advertisers and publishers; and (ii) products that facilitate other types of advertising such as social media advertising by firms offering integrated advertising tools such as Meta.³⁷²
- (228) As I discussed in Section III above, Dr. Israel's near-exclusive focus on advertiser substitution in his market definition analysis is insufficient to make this determination. A lack of close substitutes for open-web publishers can allow a hypothetical monopolist of ad exchanges for open-web display advertising to exercise market power, *even if* advertisers have close substitutes to these products (which, as I discussed in my initial report, is not the case).³⁷³

³⁶⁷ See also, discussion in Section V.B below.

³⁶⁸ Lee Initial Report, § IV.D.

³⁶⁹ Lee Initial Report, ¶ 339.

³⁷⁰ Lee Initial Report, ¶ 339.

³⁷¹ Israel Report, § IV.D.

³⁷² Israel Report, ¶ 268–269.

³⁷³ Lee Initial Report, § IV.D.1.

- (232) With regard to the particular substitutes that Dr. Israel points to in his criticisms of the ad exchange market: I discussed why open-web display is distinct from other forms of advertising in Section IV.B.
- (233) With regard to substitution to direct advertising, Dr. Israel claims that that the proposed ad exchange market “excludes all direct sales, whether conducted via programmatic means (e.g., programmatic direct) or otherwise.”³⁸¹
- (234) As an initial matter, it is important to clarify that a product is contained in the ad exchange market if it is an ad exchange that can serve indirect open-web display ads via real-time auctions; some products within this market, including AdX, *can serve programmatic direct deals as well*.³⁸² Hence, even if publishers could meaningfully move indirect transactions to direct transactions, if those publishers continued to use ad exchanges to transact those deals, then this type of substitution would not necessarily constrain a hypothetical monopolist of ad exchanges, or AdX, from charging prices significantly above competitive levels.
- (235) That said, as I discussed in my initial report and in Section IV.B above, there are important distinctions between indirect and direct ads from the perspectives of both publishers and advertisers.³⁸³ These differences limit the extent to which Dr. Israel’s claims that “if Google took steps to make sales of ad inventory via open auctions less attractive, it would risk losing sales to direct interactions between publisher and advertisers (as well as to other open exchanges)”³⁸⁴ would materialize. It is also important to note that most open-web display advertising, nearly 80% by some measures, is indirect.³⁸⁵ As Dr. Israel acknowledges, most publishers do not sell direct ads, and nearly half of all indirect impressions are sold by publishers who have no direct sales.³⁸⁶
- (236) While it is true, as Dr. Israel argues, that EDA can allow guaranteed direct deals to compete with the results of an auction for a particular piece of ad inventory, for guaranteed direct deals to discipline an exercise of market power in the ad exchange market, publishers would have to be able to shift a significant amount of inventory from indirect to direct channels in response. The important distinctions between direct and indirect advertising that I discussed in my initial report and Section IV.B make such a response unlikely. Direct evidence of Google’s exercise of market power with AdX also shows that such substitution does not occur to a sufficient degree to limit an exercise of market power in an ad exchange market. As I discuss in more detail in Section V.C below, Google’s ability to maintain a supracompetitive price for its ad exchange, as well as evidence of the value publishers

³⁸¹ Israel Report, ¶ 276.

³⁸² In 2022, 3% of web display impressions on AdX were served through programmatic direct transactions. Several other ad exchanges, including Index Exchange, Verizon, Magnite, and Equativ, also have the ability to serve programmatic direct deals. See my backup materials.

³⁸³ Lee Initial Report, § IV.B.4.

³⁸⁴ Israel Report, ¶ 283.

³⁸⁵ Lee Initial Report, Figure 31.

³⁸⁶ Israel Report, Figure 45.

and advertisers place on access to AdX despite the availability of other paths for advertisers and publishers to interact, such as direct deals, are inconsistent with the argument than a hypothetical monopolist of all ad exchanges would be unable to exercise significant market power.

IV.D.1.a. Dr. Israel does not rebut direct evidence of AdX's market power

- (237) In Section V.C.3.b of my opening report, I presented evidence that Google is able to significantly deviate from competitive behavior in the ad exchange market as direct evidence of AdX's market power: 1) Google's restriction of access and use of real-time bids from AdX to third-party publisher ad servers;³⁸⁷ 2) Google's use of AdX Dynamic Revenue Share ("AdX DRS") to engage in price discrimination;³⁸⁸ and 3) Google's implementation of Reserve Price Optimization ("RPO") to extract additional revenue from advertisers.³⁸⁹
- (238) With regard to Google's exclusive restriction of real-time bids from AdX to DFP, Dr. Israel does not dispute that providing real-time bids into more publisher ad servers would improve AdX's attractiveness to its customers.³⁹⁰ Doing so would allow advertisers to use AdX to bid more effectively into rival publisher ad servers, and publishers using non-DFP ad servers to benefit from real-time competition from AdX. In a competitive market, a firm loses significant sales if it degrades the quality of its product, all else equal. Google has engaged in such quality degradation for AdX while still maintaining a significant share of the ad exchange market.
- (239) Dr. Israel also has not rebutted AdX's DRS program (allowing it to charge a take rate as high as 40% on a per-query basis) or its RPO program (allowing it to increase AdX revenues by increasing advertiser payments) as evidence of AdX's market power. Google's ability to exercise market power with AdX provides strong evidence that it not constrained by the forces that Dr. Israel claims would constrain even a hypothetical monopolist of all ad exchanges from exercising market power.
- (240) Dr. Israel thus fails to support his claim that ad exchanges is not a well-defined relevant product market.

IV.D.2. Dr. Israel's alternative ad exchange market shares do not meaningfully inform Google's market power with AdX

- (241) I presented market shares in the ad exchange market in my initial report that showed AdX with approximately 54 to 65% of annual worldwide open-web display impressions from 2018-2022.³⁹¹

³⁸⁷ Lee Initial Report, ¶ 512.

³⁸⁸ Lee Initial Report, ¶ 514.

³⁸⁹ Lee Initial Report, ¶¶ 515–518.

³⁹⁰ I address Dr. Israel's assertion that opening up real-time bids from AdX to rival publisher ad servers would adversely impact Google's investment incentives in Section VII.B.4.

³⁹¹ Lee Initial Report, ¶ 485.

Figure 13. Lee and Israel estimates of AdX market shares among ad exchanges using Google and third-party data (2019–2022)

Geography	Metric	Lee				Israel			
		2019	2020	2021	2022	2019	2020	2021	2022
Worldwide	Impressions	60%	66%	60%	57%	Does not include	Does not include	Does not include	Does not include
	Fees	52%	51%	48%	44%	Does not include	Does not include	Does not include	Does not include
	Spend	49%	48%	44%	40%	Does not include	Does not include	Does not include	Does not include
United States	Impressions	48%	56%	51%	47%	Does not include	Does not include	Does not include	Does not include
	Fees	45%	45%	41%	37%	Does not include	Does not include	Does not include	Does not include
	Spend	43%	43%	39%	34%	43%	42%	41%	38%

Source: Backup materials for Lee Initial Report: Exchange panel; Backup materials for Israel Report, Figure 41: Israel exchange panel (see Appendix B).

Notes: Dr. Israel stated in his report that his “conclusions that Google lacks monopoly power and that its challenged conduct has not harmed competition do not depend on whether the relevant geographic market is the United States or worldwide” and that his “backup materials contain key empirical results demonstrating that all [his] conclusions hold in a worldwide geographic market.”). Israel Report, ¶ 374. However, Dr. Israel’s backup materials do not contain estimates of worldwide market shares using Google and third-party data.

(245) Dr. Israel also presents an estimate of AdX’s market share based on data from the internet security company Confiant. He finds that according to this source, AdX’s impression share is much lower than he reports from other sources, with AdX comprising “less than 30% of Confiant-monitored impressions.”³⁹⁹ However, these transactions are not limited to display advertising, and so do not correspond to any market that either Dr. Israel or I define. In addition, these market shares are also unlikely to be representative of AdX’s market share in the ad exchange market for other reasons:

- They are computed for a small sample of publishers that have chosen to use Confiant’s services.⁴⁰⁰ These publishers account for less than 10% of the volume of impressions in my exchange data.⁴⁰¹

(“SSPs”) and ad networks.”). By including transactions from products that are not contained within the ad exchange market, Dr. Israel’s shares based on indirect transactions within DFP do not represent AdX’s share of ad exchange impressions. Dr. Israel’s claim that the use of DFP in the denominator “likely overstates AdX’s share because it does not include any impressions served by non-Google ad servers” is also thus incorrect (Israel Report, ¶ 271).

³⁹⁹ Israel Report, ¶ 273.

⁴⁰⁰ Moreover, shares in the Confiant data are sensitive to the inclusion of particular publishers. For example, removing the largest publisher increases Google’s share by as much as 5.7 percentage points (Israel Report backup materials).

⁴⁰¹ To approximate the market served by Confiant, I exclude owned-and-operated inventory from my exchange panel for purposes of this comparison. To be conservative, I also limit to US users in making this comparison.

the advertiser-side or the publisher-side of the market,”⁴¹⁹ and I analyzed the value that open-web publishers derive from advertiser ad networks.⁴²⁰

- (262) As I discussed in Section IV.A.3 above, Dr. Israel’s nearly exclusive focus on advertiser substitution in his market definition analysis is insufficient for the purposes of invalidating a relevant market. A lack of close substitutes for open-web publishers can allow a hypothetical monopolist of advertiser ad networks for open-web display advertising to exercise market power, even if advertiser ad networks have close substitutes to these products (which, as I discussed in my initial report, is not the case).⁴²¹

IV.E.1.b. Dr. Israel’s arguments regarding substitution between advertiser ad networks and other buying tools such as DSPs do not invalidate an advertiser ad network market

- (263) Dr. Israel asserts that advertisers “regularly substitute” between advertiser ad networks and DSPs, and that advertiser bidding tools such as advertiser ad networks and DSPs also compete indirectly through bidding against one another on exchanges.⁴²²
- (264) Importantly, Dr. Israel does not directly assert that or test whether a hypothetical monopolist of advertiser ad networks would be unable to price above a competitive level because of this substitution. As I explained in Section IV.A.1 above, it is incorrect to imply that *some* substitution between two products necessarily means that they should properly be placed in the same relevant market, all the more so when that substitution is observed at prices likely already elevated by the exercise of substantial market power. Moreover, direct evidence that Google is able to exercise substantial market power through its advertiser ad network (Google Ads)—evidence that Dr. Israel fails to rebut— indicates that advertiser ad networks is a relevant antitrust market.⁴²³
- (265) Notwithstanding these limitations, below I explain why Dr. Israel’s analysis of advertiser ad networks overstates the similarities and the degree of substitutability between advertiser ad networks and other bidding tools such as DSPs, and also does not support his claim that a market for advertiser ad networks is not “well-defined.”
- (266) I first address Dr. Israel’s arguments related to direct substitution by advertisers between advertiser ad networks and other bidding tools. I then discuss his arguments regarding competition between advertiser ad networks and other bidding tools through their competing bids on exchanges.

⁴¹⁹ Lee Initial Report, ¶ 182.

⁴²⁰ Lee Initial Report, § IV.E.1.b.

⁴²¹ Lee Initial Report, § IV.E.1. *See also*, discussion in Section III above.

⁴²² Israel Report, ¶¶ 193–195.

⁴²³ Lee Initial Report, § V.D.3.

- (298) However, as Dr. Israel notes, “the available data for MSAN describe nearly all of its advertising as ‘native.’”⁴⁶⁸ In addition, most spending on MSAN is on Microsoft web sites. Using Dr. Israel’s method for identifying MSAN O&O properties in the MSAN data, over ■% of spending in the MSAN data is on Microsoft’s O&O properties.⁴⁶⁹ If MSAN transacted open-web display advertising, it would be a participant in the advertiser ad network market.
- (299) Dr. Israel’s focus on increased spending on MSAN over time in his Figure 19 masks that MSAN is small compared to Google Ads. Even if I were to include spending on MSAN from native advertising within the market, MSAN represents only ■% of spend in the advertiser ad network market in 2022 and would not change my conclusions regarding Google Ads’ substantial market power.⁴⁷⁰

IV.E.1.c.iii. Interpretation of Google’s pricing experiments.

- (300) In my initial report, I noted that Google has performed multiple analyses that show that Google can significantly increase Google Ads’ margins while increasing Google’s profit and net revenue earned on its ad tech products. These analyses, which are strong indicators of Google Ads’ market power, include:
- A March 2014 experiment found that an increase in Google Ads’ margin from 14% to 15% (a 1 percentage point, or 7 percent increase) resulted in an increase in Google Ads’ net revenues earned on AdX transactions.⁴⁷¹
 - A 2016 simulation showed that for fixed AdX take rates, increases in Google Ads’ margin would increase Google’s net revenues earned on AdX publishers.⁴⁷²

⁴⁶⁸ Israel Report, ¶ 208.

⁴⁶⁹ See my backup materials.

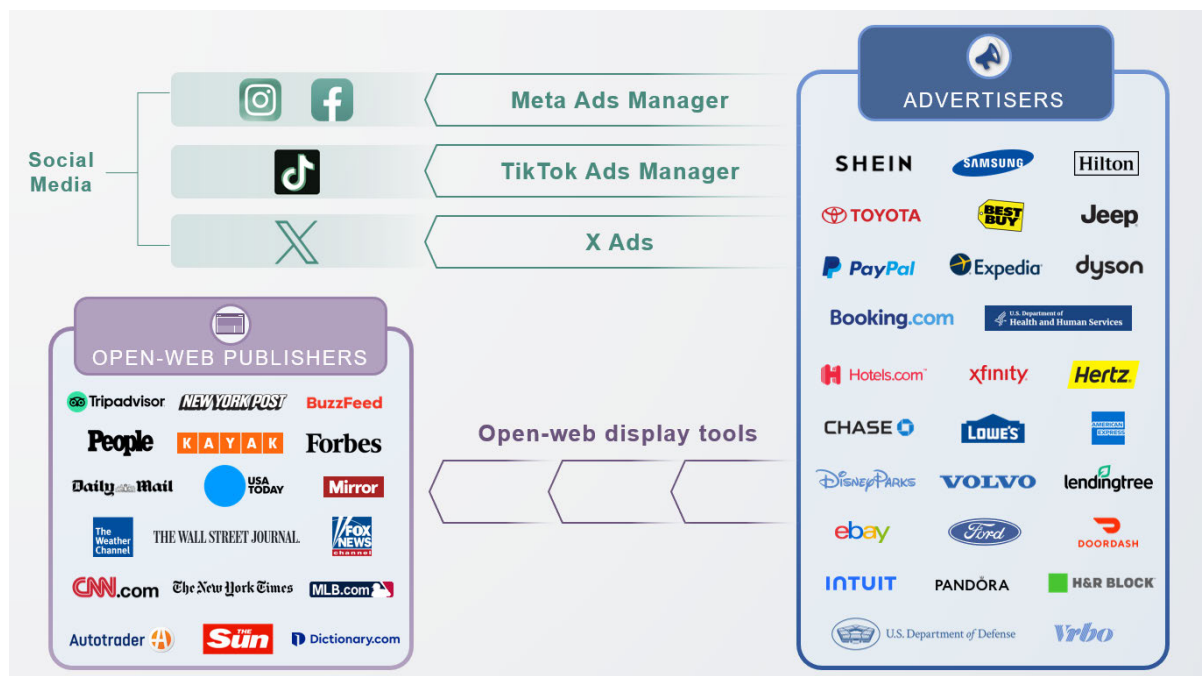
⁴⁷⁰ See my backup materials.

⁴⁷¹ Lee Initial Report, ¶ 811, Figure 77. *See* GOOG-DOJ-AT-02096186, at -186 (03/2014) (Google proposal “Increase GDN margin on AdX from 14% to 15%,” states, “Recently the GDN margin on AdSense has come closer to 32%, therefore we propose to increase the GDN buy-side margin on AdX to 15%....”; The “Measured Impact” “For AdWords on AdX slice” reads, “GDN profit +5.3%” and “Google profit +2.2%”, with “publisher payout -0.8%”. The document indicates that GDN profit is computed only on AdX publishers. The document also indicates GDN profit represents “GDN’s net revenues on AdX transactions”, and “Google profit is the amount of money collected from advertisers minus the amount paid to the publisher.”).

⁴⁷² Lee Initial Report, ¶¶ 502, 808, Figures 53, 75. *See* GOOG-DOJ-04615040, at -040, -043 (11/14/2016) (An email chain regarding simulation). For example, holding AdX’s margin at 10%, an increase in GDN’s fee from 20% to 25% would increase Google’s net revenue by approximately 8% relative to its current levels (-22.92% to -15.04%).

- (324) Moreover, in addition to including complementary products, Dr. Israel’s “ad tech tools as a whole” market contains products and options that are simply not available to open-web publisher customers. For example, open-web publishers cannot sell their web-display inventory through entities such as Meta or TikTok. However, the integrated ad tech products of Meta and TikTok are nonetheless within his alternative market.⁵⁰⁹
- (325) I illustrate this concept in Figure 19 below. Both open-web display ad tech tools and integrated properties such as Tik Tok, Meta, and X service a large number of advertiser customers. Open-web display ad tech tools also service a large number of publisher customers. However, on the publisher side, TikTok, Meta, and X only service their O&O web properties—they do not service other open-web publisher customers. Thus, open-web publishers confronted with a firm monopolizing open-web display tools, like publisher ad servers, do not have the option of using TikTok, Meta, or X to avoid an exercise of market power. Yet Dr. Israel’s “one market” approach effectively assumes that they do.

Figure 19. Illustration of open-web display tools compared to integrated ad tech products



- (326) Dr. Israel’s approach thus is at odds with principles of market definition (including those that he articulates in his report), and groups logically-distinct products and services in a way that obscures

⁵⁰⁹ Israel Report, Figure 54.

the relevant set of products over which Google is exercising market power and the harm it is causing in those markets.⁵¹⁰

- (327) For a monopolization claim, combining disparate sets of ad tech products that interoperate with one another into a single market risks overlooking how a firm can create a bottleneck position within the ad tech stack. Indeed, under Dr. Israel's proposed market definition, a single firm that owned an entire layer of the ad tech stack, or controlled every way of transacting a particular type of advertising, for example, might only comprise a small share of the broader market that Dr. Israel puts forth. But this does not mean such a firm would not wield substantial market power, nor be able to harm competition through its actions.
- (328) **Market Shares.** As discussed, Dr. Israel's single market for "ad tech tools as a whole" is not appropriate for analyzing Google's market power or the competitive effects of its conduct.
- (329) For these reasons, Dr. Israel's inferences based on the market shares that he computes in his single market for "ad tech tools as a whole" in his Figures 54–56 are unsupported and not informative for the purposes of analyzing the impact of Google's conduct.⁵¹¹

⁵¹⁰ Drawing such a broad market also violates the principle that has been articulated by the Department of Justice and Federal Trade Commission that relevant markets when used for computing market shares should be narrowly defined 2010 HMG § 4. ("Defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares...Market shares of different products in narrowly defined markets are more likely to capture the relative competitive significance of these products, and often more accurately reflect competition between close substitutes...Because the relative competitive significance of more distant substitutes is apt to be overstated by their share of sales, when the Agencies rely on market shares and concentration, they usually do so in the smallest relevant market satisfying the hypothetical monopolist test."); 2023 Merger Guidelines, § 4.4 ("The competitive significance of the parties may be understated by their share when calculated on a market that is broader than needed to satisfy the considerations above, particularly when the market includes products that are more distant substitutes, either in the product or geographic dimension, for those produced by the parties.").

⁵¹¹ In addition to these conceptual flaws, Dr. Israel's calculations also are unreliable for several other reasons. For example, Dr. Israel asserts the need for analyzing Google's conduct within a single ad tech market, but does not clearly articulate the boundaries of the market that he proposes, which he calls at various points a "single market for match-making," (Israel Report, ¶ 349), "a single two-sided market for ad tech tools," (Israel Report, ¶ 346), and "the market for ad tech products as a whole" (Israel Report, ¶ 344). Dr. Israel also claims that the relevant competitors "include any company that is active in facilitating the sale of publishers' impressions to advertisers" (Israel Report, ¶ 355), which again makes the analytical error of placing companies, not products, within relevant product markets (*see* discussion above in Section IV.A.1). Moreover, there are additional issues related to the indeterminacy in how he defines his market. Dr. Israel presents two market share calculations—one showing for Google's share of "display advertising" ad spending and one showing Google's share of "digital advertising" ad spending—without explaining clearly what products or types of transactions are included in his market share calculations (and why this is reasonable), and without explaining which of the two markets and accompanying share calculations is, in his opinion, a more appropriate way to analyze Google's conduct in this matter. Left unanswered in his descriptions of the market are exactly which products should be included, and for which types of advertising. For instance, he does not explicitly state whether direct advertising sales mediated between an advertiser and publisher sales reps without the use of third-party tools are transactions in the market as he envisions it. Similarly, Dr. Israel does not explicitly state which transactions involving which types of digital advertising should be considered as transactions in his market. For instance, it is not clear whether transactions involving search ads and the tools that facilitate them are part of the market he considers it most appropriate to define. Indeed, Dr. Israel makes no clear argument anywhere in his report that a monopolist of tools transacting all non-search digital advertising would be constrained by the presence of search advertising. Yet he calculates market shares of "all digital advertising"

- (343) I also discussed why the entire world, excluding a limited number of regions (henceforth, “worldwide”) is a relevant geographic market for all three relevant product markets.⁵³¹ I provided three reasons why worldwide is an appropriate geographic market for evaluating Google’s market power in the relevant product markets and the competitive effects of its conduct:
- 1. Customers of all three relevant product markets (advertisers and open-web publishers) are located worldwide, and transact across country and region boundaries.
 - 2. “Supply-side” competition among ad tech providers is global: the major competitors in each relevant product market serve customers across multiple countries, and scale effects are not contained within country-specific boundaries. For example, an ad tech product with greater publisher inventory across different countries likely is better able to offer advertisers the ability to target and access users that visit those publishers than one confined to a single country.
 - 3. Google’s conduct that I evaluate in this report is not limited to the boundaries of any one country. Google has imposed restrictions on the use of its Google Ads, ADX, and DFP products by open-web publishers and advertisers located worldwide. Hence, the competitive effects of Google’s conduct extend beyond any individual country’s borders.
- (344) Even though both worldwide and the United States fulfill the criteria for being relevant geographic markets, as I noted in my initial report,⁵³²
- (345) The ad tech industry and scope of Google’s conduct is [] global. Although there may be some differences in competitive conditions within narrower geographic regions, there are compelling benefits to examining the whole world when examining the competitive significance and effects of Google’s conduct within the relevant product markets.
- (346) Hence, to obtain a complete picture of the scope and impact of Google’s conduct, it is important to consider its market power and outcomes outside the boundaries of a single country.

IV.F.1. Dr. Israel incorrectly dismisses the appropriateness of a worldwide geographic market

- (347) Dr. Israel disputes the appropriateness of analyzing a worldwide market, arguing that “it is more appropriate to assess competition and the effects of Google’s challenged conduct in a geographic market limited to the United States.”⁵³³ He opines that although a worldwide market would pass a hypothetical monopolist test if a US market did, it is only appropriate to analyze a worldwide market

⁵³¹ Lee Initial Report, § IV.F.1. Moreover, I describe why the exclusion of a small number of regions where Google has limited presence or is restricted from operating in due to US sanctions does not prevent a hypothetical monopolist from profitably exercising market power.

⁵³² Lee Initial Report, ¶ 389.

⁵³³ Israel Report, ¶ 49.

what he considers a “dominant share.” In fact, the *Market Power Handbook* that Dr. Israel cites states that “some courts have held that market shares below 50 percent might nevertheless support a finding of monopoly power” and that “some courts have eschewed thresholds, and have determined that market share statistics must be considered in the context of the conditions of the specific market.”⁵⁸⁹

V.A.1.b. “Industry is dynamic such that new business models or new competitors would overtake the leading firm if it were to stop investing”

- (387) Dr. Israel’s second condition is that “[t]he industry is dynamic such that new business models or new competitors would overtake the leading firm if it were to stop investing.”⁵⁹⁰ He explains that “[t] he existence of such potential and dynamic competition means that the current market leader could not restrict market-wide output without inducing rivals to enter or expand and replace that output.”⁵⁹¹
- (388) Dr. Israel is correct that, *if* rivals can rapidly enter or expand to replace restricted output, the threat of such entry or expansion can constrain a firm’s market power.⁵⁹² Indeed, such a threat is exactly why evidence of high barriers to entry and expansion are considered indirect evidence of market power. As I explain in my initial report:

In a market with high barriers to entry and expansion, substantial market power can persist despite the incentive that high prices and profits give to potential entrants and rivals to enter or reposition to steal business. Key barriers to entry in the relevant markets include the direct costs of developing new ad tech products, attracting customers who may face significant switching or multihoming costs, and overcoming indirect network effects enjoyed by existing incumbents.

- (389) But Dr. Israel is incorrect in his assertion that for a firm to possess monopoly power, those barriers to entry must persist *even if the leading firm were to stop investing*. A firm’s investments may directly contribute to those barriers. Investment in new ad tech products may increase the direct costs to competitors of developing competitive products, or continued investment in a product may preserve or expand the indirect network effects already enjoyed by the leading firm. Other investment may

⁵⁸⁹ Mary Coleman and Bruce Hoffman, *Market Power Handbook: Competition Law and Economic Foundations* Second Ed., Chicago, Illinois, American Bar Association, 2012, Chapter V.B, pp. 106–109.

⁵⁹⁰ Israel Report, ¶ 380. *See also*, Israel Report, § V.E. (“Google invests in response to competition.”).

⁵⁹¹ Israel Report, ¶ 380.

⁵⁹² *See e.g.*, 2010 HMG § 9 (“A merger is not likely to enhance market power if entry into the market is so easy that the merged firm and its remaining rivals in the market, either unilaterally or collectively, could not profitably raise price or otherwise reduce competition compared to the level that would prevail in the absence of the merger. Entry is that easy if entry would be timely, likely, and sufficient in its magnitude, character, and scope to deter or counteract the competitive effects of concern.”). *See also* 2023 HMG § 3.2.

AdX and Google Ads, products on which Google earns significant margins.⁹⁴⁴ Hence, these pricing patterns are not inconsistent with DFP’s monopoly power.

- (590) Dr. Israel’s second claim—that DFP’s success “is equally consistent with successful competition on the merits as with anticompetitive foreclosure”⁹⁴⁵—is unpersuasive, especially in light of more specific information from Google regarding the impact of real-time competition on Google’s rate card;⁹⁴⁶ the explicit limitations on integrating AdX with rival publisher ad servers;⁹⁴⁷ and testimony from third parties regarding the impact of those limitations on their ability to compete for publishers.⁹⁴⁸
- (591) Third, a comparison to in-app mediation platforms is not informative about the effects on open-web display publisher ad servers without a showing of how, if at all, competitive conditions are similar between the different settings. For example, Dr. Israel does not analyze AdX’s competitive significance for in-app advertising before making this comparison. He also makes the repeated error of concluding from the mere existence or entry of other participants (here, outside of the relevant markets) that there could not have been competitive harm from particular conduct.
- (592) Last, Dr. Israel incorrectly claims that positive publisher reactions to the integration between DFP and AdX in 2018 (after the scrutinized conduct initiated) is evidence that “Plaintiffs mislabel[] competition on the merits via efficient integration as anticompetitive tying.”⁹⁴⁹ As I discuss further in Section IX.A, Dr. Israel fails to show how the purported benefits he claims from integration—even if valid—are specific to this particular conduct (which is not about integrating DFP with AdX, but rather the *exclusion* of rival publisher ad servers from AdX’s real-time bids).

VII.B.4. Dr. Israel fails to show that providing AdX’s real-time bids to rival publisher ad servers would substantially harm Google’s investment incentives

- (593) Similar to the case with Google Ads demand, Dr. Israel suggests that providing access to real-time bids from AdX to rival publisher servers would also “likely harm investment incentives and welfare.”⁹⁵⁰ He claims that providing such access “would not just require Google to contract with rival publisher ad servers, but to modify its AdX product to facilitate such interactions.”⁹⁵¹

⁹⁴⁴ Lee Initial Report, § V.B.3.a.

⁹⁴⁵ Israel Report, ¶ 658.

⁹⁴⁶ Lee Initial Report, ¶ 641.

⁹⁴⁷ Lee Initial Report, ¶ 640.

⁹⁴⁸ Lee Initial Report, ¶ 642.

⁹⁴⁹ Israel Report, ¶ 660.

⁹⁵⁰ Israel Report, § IV.B.

⁹⁵¹ Israel Report, ¶ 518.

- (594) Here Dr. Israel’s claims are again speculative, focusing only on investment incentives and not actual investments: Dr. Israel does not provide evidence that supplying rival publisher ad servers with real-time bids from AdX would reduce its investments in AdX. Dr. Israel also does not address the implications raised by the presence of AdX Direct (whereby Google has already contracted with rival publisher ad servers), and he does not explain how—if his claims are valid—such an integration with rivals is compatible with preserving Google’s investment incentives. Finally, Dr. Israel ignores the possibility of a more competitive market generating more overall investment.

VII.C. Google exclusively provided AdX with Dynamic and Enhanced Dynamic Allocation features, denying “first look” and “last look” advantages to rival exchanges

- (595) In my initial report I discussed “how Google, until the introduction of Exchange Bidding, provided only AdX with the ability to participate in Dynamic and Enhanced Dynamic Allocation within DFP. Google exclusively provided AdX with this advantage—and the associated benefits of “first look” and “last look”—and left rival exchanges with fewer and less valuable impressions to bid upon within DFP.”⁹⁵² I explained that:

- Google provided AdX with the opportunity to compete in real-time against guaranteed- and non-guaranteed line items within DFP’s Dynamic Allocation (DA) and Enhanced Dynamic Allocation Features.⁹⁵³ Other ad exchanges were not provided with this opportunity by DFP before Exchange Bidding (Open Bidding), which was fully launched in 2018.
- Prior to Open Bidding, AdX was able to bid on impressions before the other non-guaranteed line items in the waterfall had an opportunity to produce a “live” price (even though the live price could have been higher than the winning AdX bid), thereby allowing AdX to win an impression even if some other demand source was willing to pay more.⁹⁵⁴ For those ad exchanges participating through header bidding, AdX was able to use what the publisher submitted as the winning header-bidding price as the floor for its auction.⁹⁵⁵
- This exclusive access within DFP provided with AdX “first look” advantages over ad exchanges in the waterfall, and “last look” advantages over ad exchanges that submitted bids through header

⁹⁵² Lee Initial Report, § VII.D.1.

⁹⁵³ Lee Initial Report, ¶¶ 662–664.

⁹⁵⁴ GOOG-DOJ-AT-00292252, at -256 (10/10/2019) (In a Google slide describing the problems with the waterfall setup, the slide acknowledges that “line items were compared on their average CPMs not their ‘live CPMs’.” The slide also shows an example where the second line item has a historical CPM of \$1.5, but a “Live” CPM of \$3. Since the first line item has a historical CPM of \$2, Dynamic Allocation would allow AdX to compete in real-time against the \$2 price, potentially allowing AdX to win at just over \$2 before the second line item could produce a live price of \$3).

⁹⁵⁵ GOOG-DOJ-15277215, at -221 (05/05/2016).

- (618) Prof. Milgrom also claims that “it is reasonable to expect that in all or most cases [remnant bidders] would suffer even less adverse selection than guaranteed contracts.”⁹⁹⁸ However, the example above illustrates that even though there may be no adverse selection against rival exchanges in terms of pCTR, there can still be cherry-picking in terms of CPM.
- (619) Hence, Prof. Milgrom’s analysis of adverse selection fails to establish that rival ad exchanges did not receive lower-CPM impressions due to AdX’s first-look advantage.
- (620) Last, Prof. Milgrom claims that DA had substantial benefits for publishers compared to the “status quo ante”⁹⁹⁹ and makes a similar argument regarding EDA.¹⁰⁰⁰ As I discussed above, comparisons between DA and the waterfall (or other such comparisons) are not related to the conduct at issue, which is Google’s exclusive provision of DA and EDA and the associated first- and last-look advantages to AdX over rival ad exchanges. Prof. Milgrom’s claims do not address whether publishers would have been better off had other rival ad exchanges also been able to compete in real time against AdX within DA and EDA. Prof. Milgrom’s claims also ignore the likelihood that weakening of rival exchanges and lessening of competition within the ad exchange market could ultimately harm publishers.¹⁰⁰¹

VII.C.2.b. Last Look

- (621) Prof. Milgrom makes the following claims regarding AdX’s last-look advantage over ad exchanges participating in header bidding.
- (622) First, Prof. Milgrom claims that “publishers benefited from the so-called ‘last look’”,¹⁰⁰² arguing that although “publishers could use header bidding to sell online display advertising impressions without ever calling GAM or another publisher ad server,”¹⁰⁰³ allowing “AdX bidders a chance to bid on

correlated with pCTR, allocation to EDA appears to have been made conditional on pCTR to mitigate potential adverse selection. The document noted that “[a]ll publishers will be moved to EDA with CTR.”

⁹⁹⁸ Milgrom Report, ¶ 325.

⁹⁹⁹ Milgrom Report, ¶ 286.

¹⁰⁰⁰ Milgrom Report, ¶¶ 306–309. Prof. Milgrom also claims that “whenever EDA allowed AdX to compete for an impression, it also allowed any non-guaranteed line items representing non-Google exchanges (and other demand sources) to compete” (Milgrom Report, ¶ 311). However, my understanding based on the document that Prof. Milgrom cites to support his point indicates that such remnant line items would be ranked with the static price assigned to it and would not be able to compete for the impression with a real-time bid. *See* GOOG-DOJ-06885161, at -169 (10/07/2017) (describing the reserve price associated with a remnant line item as “remnant reserve price (input by pub).”).

¹⁰⁰¹ For example, Prof. Milgrom argues that publishers had incentives to set “value CPMs higher than the historical average revenues of demand sources” and uses a simulation to show that if publishers set floor prices optimally, they would earn about 13% more revenue than using historical average prices (Milgrom, ¶ 290). However, Prof. Milgrom’s simulation assumes the values offered by rival exchanges do not change with the introduction of DA, which would not be the case if DA adversely affected their ability to compete.

¹⁰⁰² Milgrom Report, § VIII.C (Publishers Benefited from the So-Called “Last Look”).

¹⁰⁰³ Milgrom Report, ¶ 345. Note that this was not likely a viable option for most publishers given the value of using a publisher ad server, as well as DFP’s exclusive access to real-time bids from AdX and unrestricted access to Google Ads demand.

inventory provided” certain benefits for publishers.¹⁰⁰⁴ However, providing last-look to AdX was not the only means to realize these specific benefits. For example, they could have also been achieved if header bidding exchanges were able to bid in real-time simultaneously against AdX. More importantly, Prof. Milgrom’s argument does not account for the adverse effects on competition among publisher ad servers and ad exchanges.¹⁰⁰⁵

- (623) Second, Prof. Milgrom opines that “the AdX second-price auction with a floor price based on winning header bids” does not “inevitably advantage AdX bidders.”¹⁰⁰⁶ (Note that this is a different inquiry than examining whether last-look in fact resulted in an advantage for AdX, given how advertisers, publishers, and other participants actually behaved, which I discuss below.)
- (624) To support his claim, he provides a theoretical result.¹⁰⁰⁷ He observes that if bidders are symmetric, a unified second-price auction with all bidders participating and with optimally chosen floor is the revenue maximizing auction (meaning that no other auction can produce greater average revenues for a publisher);¹⁰⁰⁸ he then notes that in this auction “each header bidder has the same chance of winning and the same expected surplus as an identical bidder on AdX.”¹⁰⁰⁹ He then proves that if bidders are symmetric and publishers set optimal price floors and optimally inflate the winning header bidding bid before passing it as a floor in the AdX auction, then a “first-price header bidding auction followed by a second-price auction for AdX” earns the publisher the same expected revenue and generates the same expected bidder outcomes as the aforementioned “single unified second-price auction with all bidders participating.”¹⁰¹⁰
- (625) Prof. Milgrom’s theoretical result depends on the assumption that bidders are symmetric—i.e., they have valuations drawn from the same distribution. That assumption does not likely apply to bidders in most auctions for the following reasons:
- Bidders are likely not symmetric across or even within exchanges. As I showed in my first report, the demand on Google Ads is distinct from the demand on other exchanges.¹⁰¹¹

¹⁰⁰⁴ Milgrom Report, ¶ 345. Prof. Milgrom lists two benefits: 1) GAM’s ad selection process could increase revenue from the impression; and 2) publishers could take advantage of the other services provided by GAM. Milgrom Report, ¶¶ 346–347.

¹⁰⁰⁵ Lee Initial Report, §§ VII.F.1.b and VII.F.2.b.

¹⁰⁰⁶ Milgrom Report, ¶ 351.

¹⁰⁰⁷ In particular, he examines whether “if a publisher chooses floor prices *optimally* to maximize its average revenues and advertisers bid to maximize their profits, are AdX bidders **always** advantaged compared to header bidders as a consequence of the so-called ‘last look’?” Milgrom Report, ¶ 355 (bold added, italicized in original).

¹⁰⁰⁸ Milgrom Report, ¶¶ 362, 542.

¹⁰⁰⁹ Milgrom Report, ¶ 357.

¹⁰¹⁰ Milgrom Report, ¶ 357.

¹⁰¹¹ Lee Initial Report, ¶ 614.

VII.E.2. Dr. Israel fails to rebut my opinion that Google's AdMeld acquisition harmed competition among publisher ad servers

- (685) Dr. Israel claims that Google's acquisition of AdMeld did not harm competition in the publisher ad server market by arguing that "[p]laintiff's experts do not assert or demonstrate that AdX provided real-time bids to rival publisher ad servers prior to the acquisition of Admeld and it is my understanding that they did not do so."¹¹²⁵
- (686) However, Dr. Israel's claim is not responsive to harm arising from the merger. In my initial report, I noted that "Google's acquisition of AdMeld also removed an option for publishers to access real time bids through a non-DFP publisher ad server."¹¹²⁶ This conclusion is consistent with evidence that, pre-acquisition, AdMeld had real-time bidding functionality that could be used by publishers with non-DFP publisher ad servers to access non-AdX demand sources.¹¹²⁷ Post-acquisition, after Google combined AdX and AdMeld into "a single offering," a Google document indicated that the combined product would adopt AdX's terms (which did not provide real-time bids into rival publisher ad servers).¹¹²⁸ Dr. Israel does not dispute this.
- (687) Hence, Dr. Israel fails to rebut my opinion that Google's acquisition of AdMeld harmed competition among publisher ad servers.

¹¹²⁵ Israel Report, ¶ 747–749.

¹¹²⁶ Lee Initial Report, ¶ 733.

¹¹²⁷ Lee Initial Report, ¶ 731, citing GOOG-DOJ-03606441, at -448 (09/01/2012) ("Admeld can be called via API to serve an ad. There are small handful of Admeld sellers that currently have API integrations in place at the ad server level. While these integrations are being considered, they are not currently planned. There are policy implications for supporting these types of integrations on AdX; most notably, they pass real-time AdX pricing into a non-DFP ad server."). *See also*, GOOG-DOJ-09448411, at -412–414 (06/11/2012) (An email exchange between Google employees discussing a request from a client states, "Metanetworks is looking to implement the integration they used to have with AdMeld. Admeld got to see the querie [sic] from Meta in an RTB integration and decide wether [sic] to take it or not, putting a bid to their system. They want to see if that is feasible with AdExchange." A Google employee responded, stating that "even a bid-based server side integration like the Admeld api would be against adx sellside policy.").

¹¹²⁸ GOOG-DOJ-03540728, at -728–729 (01/23/2012) (An email on "Admeld Integration," noting "[w]e are consolidating the products to a single offering, based on the AdX product" and "DFP Yield Management effort and coordination[.] Establish a path forward for DFP YM report given the proposal that the functionality be under the ADX contract terms.").

Appendix B. Additional figures

B.1. Additional market definition figures

Figure 62. Regression of publisher CPMs on an indicator variable for in-app transactions and publisher fixed effects

Results	Baseline regression	Include flag for indirect transactions	Indirect transactions only	Direct transactions only
Mobile app indicator	0.5208*** (0.0657)	0.5071*** (0.0650)	0.5401*** (0.0955)	0.4292*** (0.0840)
Indirect indicator		-0.9996*** (0.0546)		
Constant	1.6705***	2.1718***	1.1507***	2.2115***

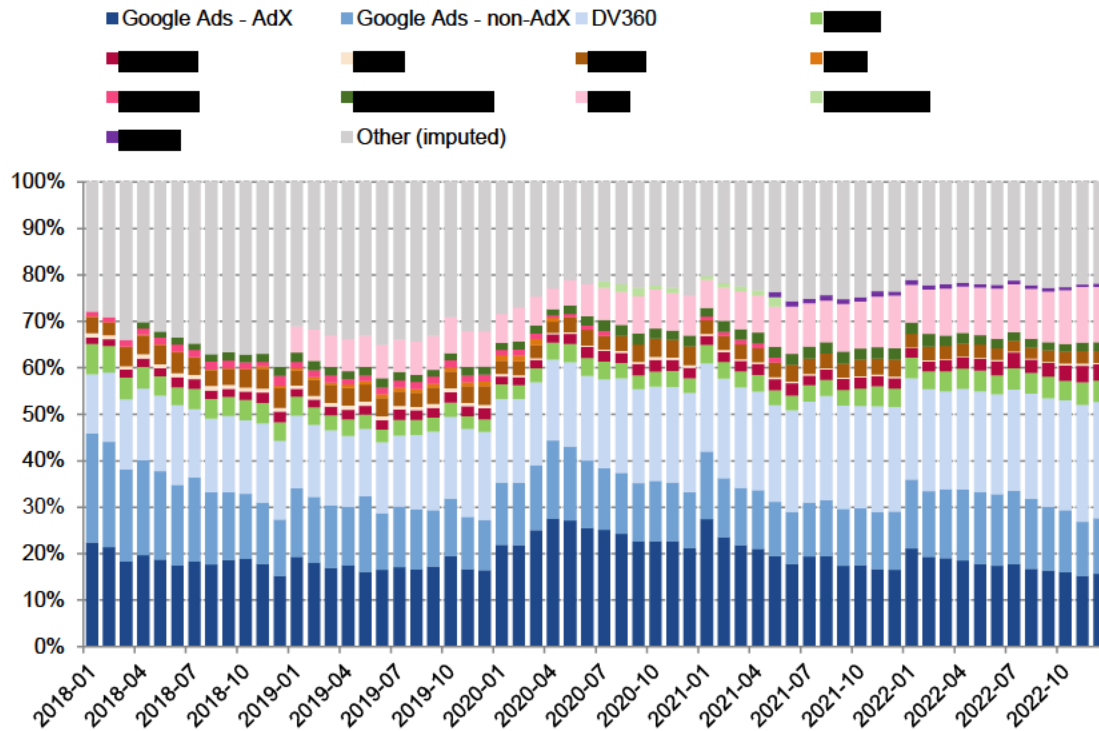
Source: DRX Internal Stats (DOJ RFP 57).

Notes: Limited to display impressions for top 1,000 publishers in each year between 2018 and 2022. Observations with CPMs greater than \$100 are excluded.

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B.2. Additional market shares figures

Figure 69. Google Ads maintained a substantial share of US indirect open-web display impressions among all advertiser bidding tools (2018–2022)

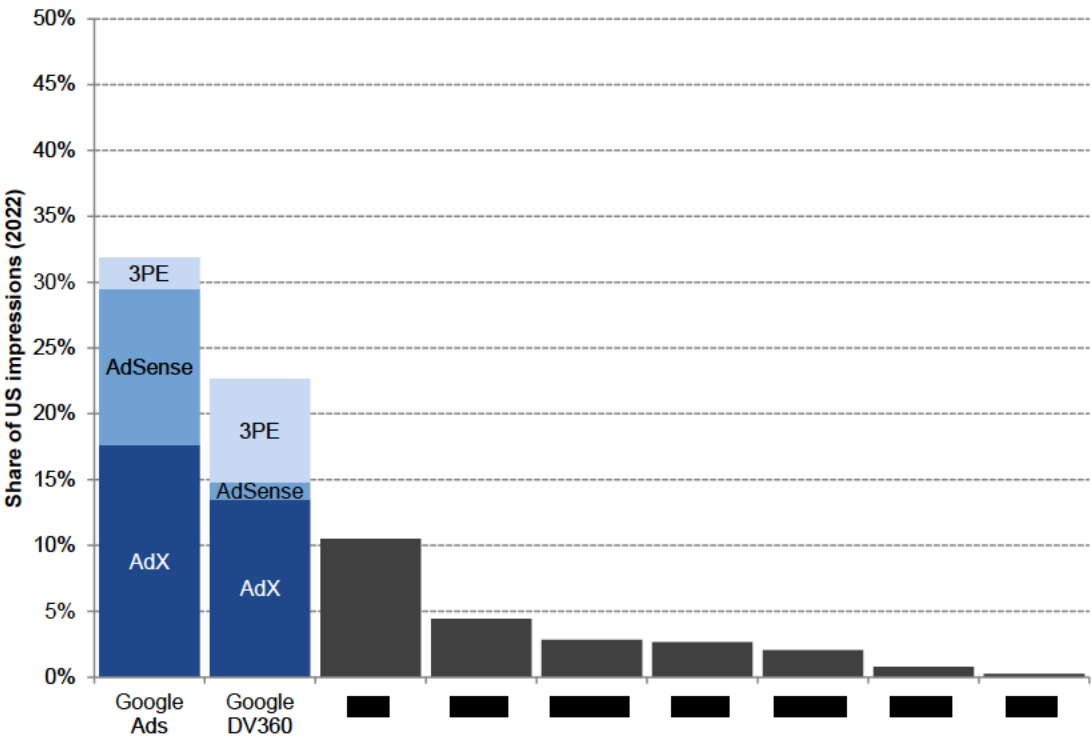


Source: Google Ads data (DOJ RFP 54); Bidding tools panel.

Notes: Denominator includes open-web display impressions from Google Ads, DV360, and bidding tools that produced data in this matter as well as impressions that I estimate coming from bidding tools that did not produce data on this matter. Appendix H of my Initial Report contains a description of how I perform this estimation.

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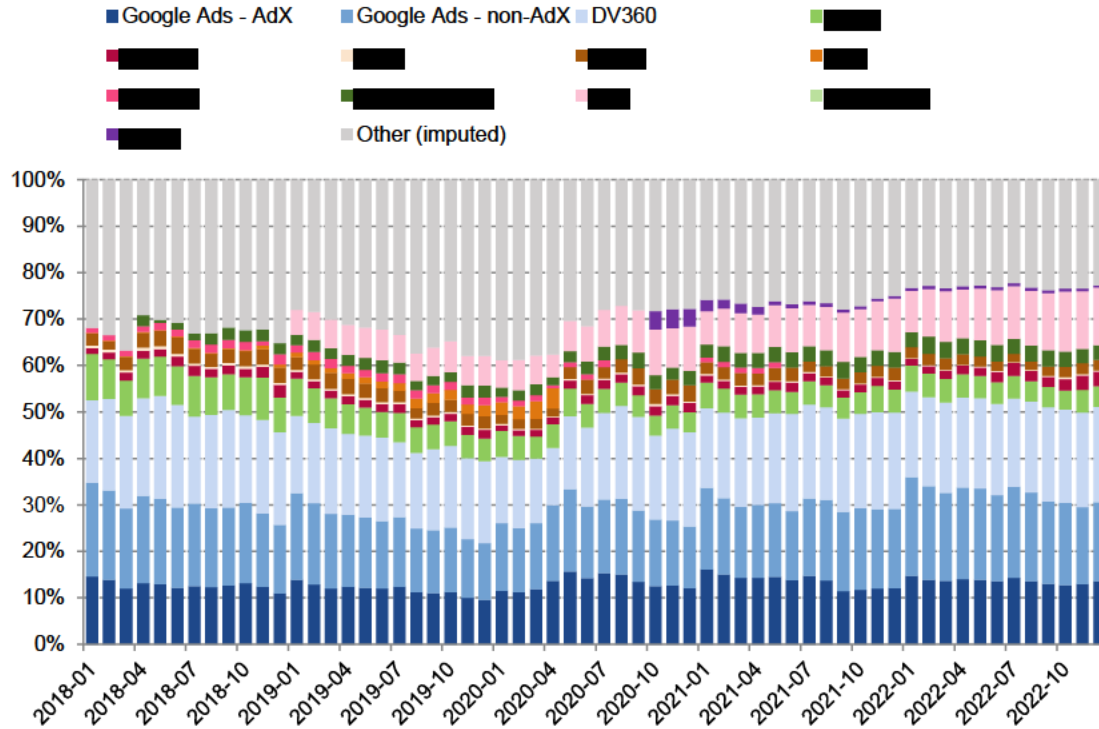
Figure 70. Google and third-party bidding tools' shares of US indirect open-web impressions (2022)



Source: Bidding tools panel.
Notes: The figure plots fees from Google's bidding tools (in blue), broken out by transactions through AdX, AdSense, and non-Google exchanges, alongside fees from non-Google bidding tools (in grey).

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Figure 71. Google Ads maintained a substantial share of worldwide indirect open-web display spending among all advertiser bidding tools (2018–2022)

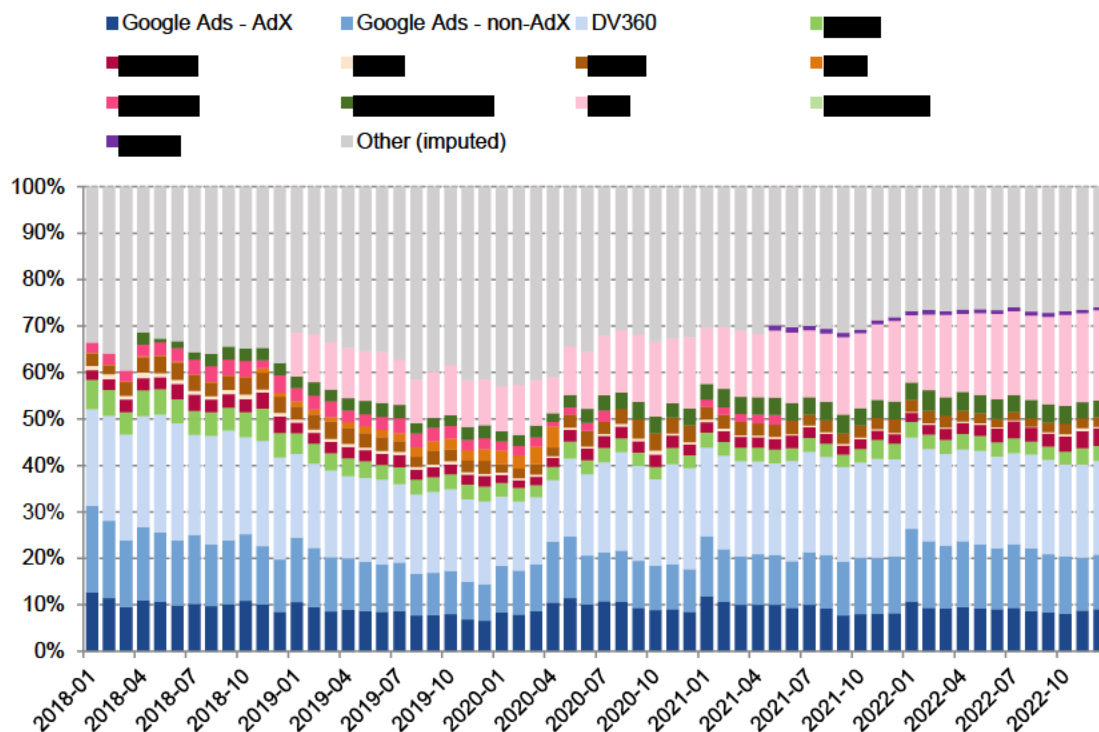


Source: Google Ads data (DOJ RFP 7); Bidding tools panel.

Notes: Denominator includes open-web display spending from Google Ads, DV360, and bidding tools that produced data in this matter as well as spending that I estimate coming from bidding tools that did not produce data on this matter. Appendix H of my Initial Report contains a description of how I perform this estimation.

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Figure 72. Google Ads maintained a substantial share of US indirect open-web display spending among all advertiser bidding tools (2018–2022)














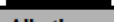


Source: Google Ads data (DOJ RFP 7); Bidding tools panel.

Notes: Denominator includes open-web display spending from Google Ads, DV360, and bidding tools that produced data in this matter as well as spending that I estimate coming from bidding tools that did not produce data on this matter. Appendix H of my Initial Report contains a description of how I perform this estimation.

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Figure 88. Extension of Israel Report, Table 16, for AdX and exchanges participating in open bidding on GAM, worldwide (2022)

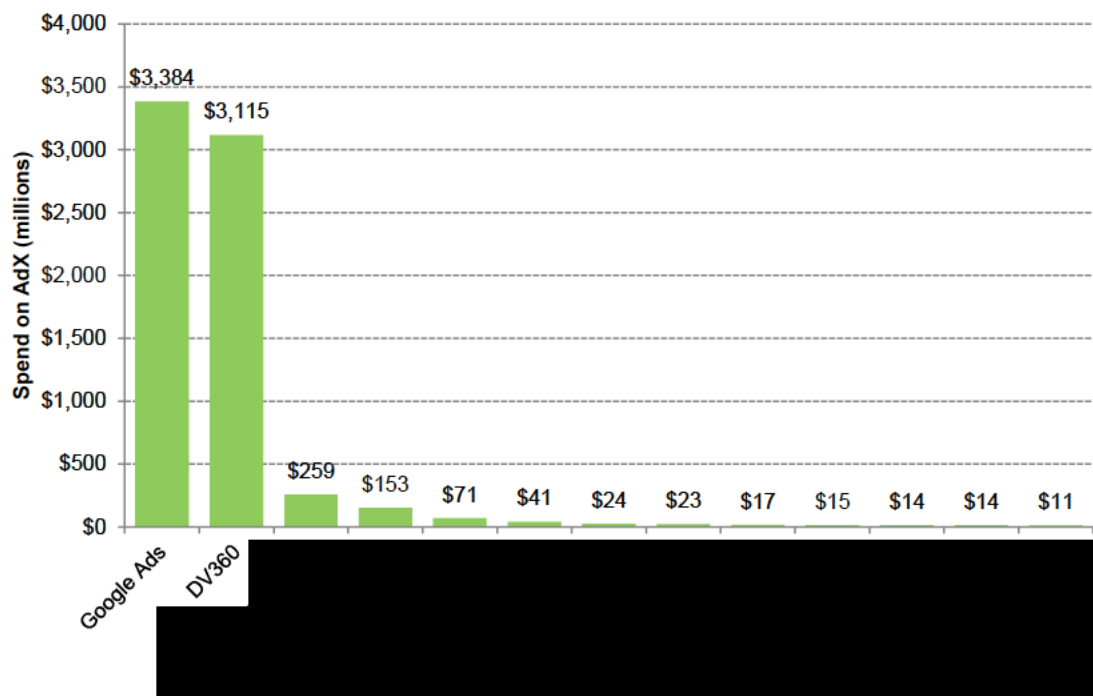
Exchange	Spending (\$ millions)	Impressions (billions)	Ratio of AdX spending to other exchange spending	Ratio of AdX impressions to other exchange spending
AdX (non-OB)	\$7,296.4	6,470.0	1.0	1.0
	\$129.8	107.6	56.2	60.1
	\$123.3	135.3	59.2	47.8
	\$122.1	90.5	59.8	71.5
	\$75.9	92.7	96.1	69.8
	\$59.7	42.3	122.3	153.1
	\$59.1	42.3	123.5	153.1
	\$41.1	43.0	177.4	150.5
	\$33.2	16.4	220.1	395.4
	\$23.0	26.3	317.5	245.8
	\$19.2	20.6	379.2	313.5
	\$18.8	12.7	389.0	509.6
	\$18.5	17.9	395.1	360.6
	\$13.9	5.3	524.3	1215.9
	\$13.1	6.0	556.7	1076.4
All others	\$31.6	25.8	230.8	251.0
All non-Google	\$782.2	684.7	9.3	9.4

Source: Google AdX/Open Bidding data (DOJ RFP 7).

Note: "AdX (non-OB)" in this figure consists of all the spending from non-Google authorized advertiser buying tools in Israel's data, as well as Google Ads and DV360. Buying tools with less than \$10 million in spend were grouped into "All others."

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Figure 89. Scale of Google Ads and DV360 in comparison to that of non-Google advertiser bidding tools, measured by spending on AdX, worldwide (2022), extension of Israel Report, Table 16, left panel



Source: Google AdX/Open Bidding data (DOJ RFP 7).

Note: Dr. Israel's data lists DV360 as an exchange, but it has been re-classified as a bidding tool for the purposes of this analysis. Unlike Israel Table 16, this figure includes all worldwide spend.